Washington State Department of Health

Protocol for Diagnostic Adiological Assessment: Follow-up for Newborn Hearing Screening

It is recommended that infants who are referred from newborn hearing screening for audiological assessment be evaluated using the following protocol before 3 months of age. This protocol was developed by a workgroup comprised of 11 audiologists practicing in Washington, with extensive knowledge and expertise in the screening and diagnosis of hearing loss in newborns and infants. The protocol includes guidance set forth by the Joint Committee on Infant Hearing (JCIH).

1. Obtain hospital screening results and a medical history, including the presence of any risk indicators.[1]
2. Perform an otoscopic evaluation.
3. Obtain acoustic immittance measures using a high frequency probe tone (optional).[2]
4. Obtain evoked otoacoustic emissions (TEOAE and/or DPOAE).

   In evaluating OAEs, the following stimulus levels are recommended: L1=65 dB SPL & L2=50 dB SPL (DPOAE) or 80 dB pSPL (TEAOE)

   - If normal **and** infant does not meet high-risk criteria and has not failed a prior auditory brainstem response (ABR)— STOP TESTING. Infants who are not identified with hearing loss, but have one or more risk factors, should be evaluated every 6 months until 3 years of age.
   - If (**1**) abnormal **or** (**2**) normal, but failed prior ABR, or (**3**) normal, but infant has risk factors, should be referred to an ENT specialist before pursuing ABR.[3]
5. If OAEs abnormal for one or both ears, perform a diagnostic click-evoked auditory brainstem response (ABR) via air conduction (can be completed at same or subsequent visit):

   - Obtain a 70 or 75 dB nHL response to click stimulus to assess the latency and morphology of waves I, III, V, I-III, III-V, and I-V.
   - Obtain a 30 or 35 dB nHL response to click stimulus to assess the latency and morphology of wave V.

   In evaluating absolute and interpeak latencies, the use of age-appropriate norms is recommended

   - If normal and infant has passed diagnostic OAE, audiologist may choose to stop testing. Infants who are not identified with hearing loss, but have one or more risk factors, should be evaluated every 6 months until 3 years of age.
   - If (**1**) abnormal, or (**2**) normal, but failed prior diagnostic OAE, perform frequency-specific ABR.

[1] **Risk indicators for use with neonates (birth to 28 days) include:** (1) an illness or condition requiring admission of 48 hours or greater to a neonatal intensive care unit (NICU), (2) stigmata or other findings associated with a syndrome known to include a sensorineural and/or conductive hearing loss, (3) family history of permanent childhood sensorineural hearing loss, (4) craniofacial anomalies, including those with morphological abnormalities of the pinna and ear canal, (5) in utero infection such as cytomegalovirus, herpes, toxoplasmosis, or rubella.

Risk indicators for use with neonates or infants (29 days through 2 years):

(1) parental or caregiver concern regarding hearing, speech, language and/or developmental delay, (2) family history of permanent childhood hearing loss, (3) stigmata or other findings associated with a syndrome known to include a sensorineural or conductive hearing loss or Eustachian tub dysfunction, (4) postnatal infections associated with sensorineural hearing loss including bacterial meningitis, (5) in utero infections such as cytomegalovirus, herpes, toxoplasmosis, or rubella, (6) neonatal indicators-specifically hyperbilirubinemia at a serum level requiring exchange transfusion, persistent pulmonary hypertension of the newborn associated with mechanical ventilation, and conditions requiring the use of extracorporeal membrane oxygenation, (7) syndromes associated with progressive hearing loss such as neurofibromatosis, osteopetrosis, and Usher's syndrome, (8) neurodegenerative disorders, such as Hunter's syndrome, or sensory motor neuropathies, such as Friedrieich's ataxia and Charcot-Marie-Tooth syndrome, (9) head trauma, (10) recurrent or persistent otitis media with effusion for at least 3 months.

[2] **Incorporate an immittance battery with caution.** For infants under approximately 4 months of age, multifrequency testing is most appropriate, but normative data are lacking. For infants older than 4 months, the immittance battery becomes more reliable and valid.

[3] **Audiologists may use their discretion** in determining whether they want to refer the infant to an ENT specialist prior to further testing.

6. Perform frequency-specific ABR using unmasked Blackman-gated tonebursts or tonebursts presented in notched noise:
    - Obtain threshold response to a 500 and 4000 (or 2000) Hz toneburst
    - Consider obtaining threshold response to 2000, 1000, and/or 250 Hz (based upon results)
7. Perform a click-evoked auditory brainstem response (ABR) via bone conduction.

Infants identified with hearing loss should be referred to and ENT for medical/surgical care, and to the Infant Toddler Early Intervention Program (ITEIP). Audiologic monitoring should occur every 3 months.

Infants who are not identified with hearing loss, but have one or more risk factors, should be evaluated every 6 months until 3 years of age.

Sharing Diagnostic Results with Families

1. Recognizing the emotional impact that a diagnosis of hearing loss can have on a family, the audiologist should provide the family with information about the degree of hearing impairment, it's potential impact on speech and language development, the treatment options available, as well as the positive impacts of early identification and intervention.
2. Information and test findings should be delivered in a positive manner, with sensitivity to the emotional needs of the parents.
3. Audiologists should provide families with information that addresses, but is not limited to, the following subject areas related to educating parents and families about hearing loss and its impacts. The format of this information should be consistent with the family's needs and desires, language and cultural needs, and their ability to interpret information:
    - Information regarding the role of the Family Resource Coordinator (FRC), their scope of responsibility, and how to access their services.
    - Information about how to access parent/family support groups, and support networks in the deaf/hard of hearing communities.
    - Information on future diagnostic follow-up and referral to early intervention services.
4. If the family expresses a desire to utilize the services of a FRC, secure parental permission to contact the FRC to facilitate successful follow-up and provide the family with access information. (This information is available through the Lead FRC in the family's home county.)
5. Recognizing that families may not be ready to absorb all of the information in the initial diagnostic evaluation, the audiologist should arrange further discussions with the family, appropriate to the family's needs and desires. These follow-up discussions may take the form of additional counseling visits, telephone conversations, or additional counseling coordinated with future clinic visits.

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Washington State Department of Health

Nancy Dalrymple, MPH
20435—72nd Ave S
Suite 200
MS: K17-8
Kent, Washington 98032

253-395-6729